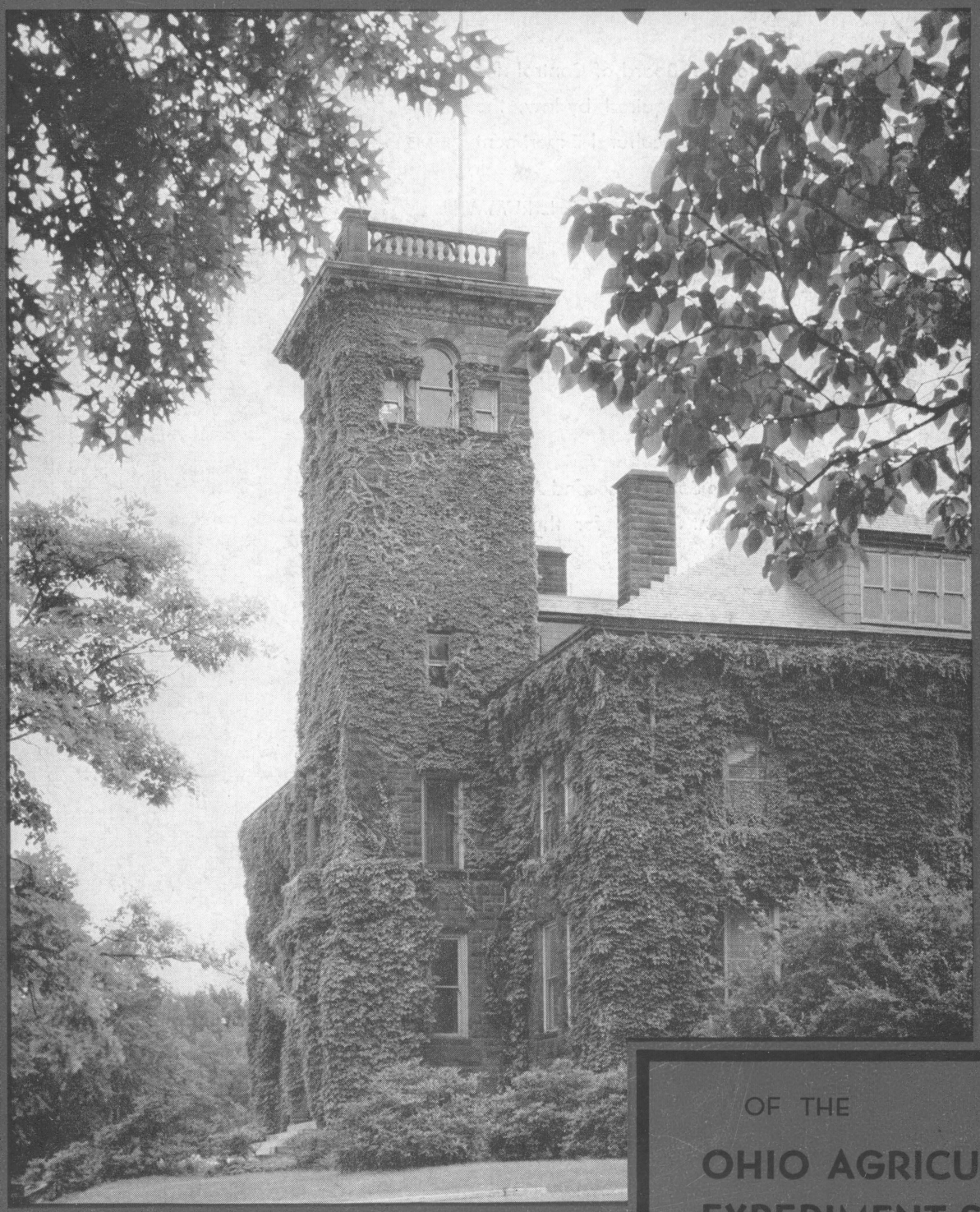
SEVENTY SECOND

ANNUAL REPORT



OF THE

OHIO AGRICULTURAL EXPERIMENT STATION

Wooster, Ohio

BULLETIN 740

SEPTEMBER 1953

The Honorable R. N. Gorman
President of the Board of Control
Ohio Agricultural Experiment Station

Dear Sir:

I have the honor to present to the Board of Control for transmission to the Governor of Ohio, as required by law, the Seventy-second Annual Report of the Ohio Agricultural Experiment Station for the year ended June 30, 1953.

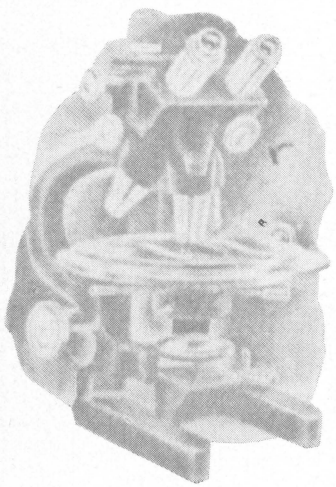
L. L. RUMMELL
Director

The Honorable Frank J. Lausche
Governor of Ohio

Dear Sir:

I have the honor to present to you the Seventy-second Annual Report of the Ohio Agricultural Experiment Station for the year ended June 30, 1953.

R. N. Gorman
President, Board of Control



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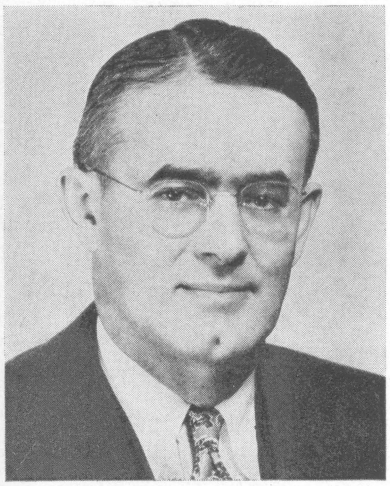
The Year in Review . . .



L. L. RUMMELL

The current year 1952-53 saw the most comprehensive research program in progress at the Ohio Agricultural Experiment Station in its history. It was a year, too, that presented the benefits of good public relations and recognition of the institution's worth to the citizens of the state.

An Agricultural Experiment Station is a public-supported research institution that has a daily value to every taxpayer, not just to farmers alone. The uninformed city resident is wont to consider the experiment station a laboratory only to make farmers more efficient and therefore more prosperous.

Each day every citizen may enjoy three square meals with food in abundance, of good quality and at economical cost because research has made such production possible. Nowhere else on earth is the farmer so efficient in his output per man or per hour. Nowhere else are people better fed. To no other nation can starving countries look for food.

Both the federal and state governments help finance agricultural research to insure a nation's food supply, to conserve the natural resources of the land, and to insure national security.

During the year thousands of persons visited the main station at Wooster or some of the nine district and county farms; thousands received its publications and listened to programs where staff members explained the latest facts of research.

FARMERS AND INDUSTRY ALLY WITH STATION

Selected groups were invited to a series of meetings at Wooster, Columbus, and Outlying Farms where special areas of research were studied and suggestions were offered to guide us in budget requests. Agricultural forces in the state combined their efforts in one program for support of agricultural research and education. The result was the agricultural experiment station received for the next biennium the largest increase in appropriations in its history, including substantial funds for expansion of the physical plant. A sympathetic state administration and effective leadership in the General Assembly recognized the importance of agricultural research. There was never before a greater demonstration by farmers and industries allied with agriculture of their confidence in the experiment station and of their belief that by research is agriculture to progress and meet future food needs of a fast-swelling population.

Research during the year made notable contributions to the industry. Many projects extend for years to insure results of measurable significance. A few give immediate answers for daily farm practice.

STRIKING RESEARCH PROJECTS IN PROGRESS

This year the legion of Ohio farmers coming to the Station saw some striking research projects in progress. For instance, beef cattle men saw bulls gaining faster and making cheaper beef than steers, and saw fastest gains of all made by bulls treated with a sex hormone, diethylstilbestrol. They are revising their ideas about type of commercial meat animals, depending upon performance of bulls and their offspring in the feedlot and breeding for meat-producing ability rather than for some show-ring fancy.

In swine production a new type is sought, a meat-type hog with a minimum of fat. He grows faster, makes pork cheaper and satisfies a present-day consumer demand. Markets are now paying a premium for such meat, and our recent research has developed a plan whereby such values can be determined on the hoof.

With dairy animals the dread malady of many cows at freshening, namely, milk fever, seems to be controllable by heavy feeding of vitamin D just prior to parturition. Hay quality appears to have a relationship to mastitis susceptibility.

Artificial insemination is improving Ohio herds, with about a third of the million dairy cows in the state so treated. The Trumbull County Experiment Farm herd of about 30 females is 100 percent the result of artificial breeding. Last year it averaged 14,700 pounds of milk per cow.

Grassland farming is a current topic, a product of soil conservation—a means of lowering dairy costs. The Ohio Station has two pasture farms (Wooster and Trumbull County) and is establishing a third (at Castalia), which attract thousands of dairy farmers annually to study their lessons in pasture improvement, grass silage, high roughage feeding of heifers and cows, and lower milk costs.

Basic studies in soils and crops form the backbone of any agricultural experiment station. Some plots are continued for decades to insure absolute recommendation of best procedures in soil management, fertilization, and culture of crops. New aspects include soil management to improve structure, additives like krilium, drainage studies, and improvement of pastures. Turf studies are included to satisfy those interested in lawns, golf courses, roadside parks and the like. These lawn tests rate high in popularity with visitors.

NEW FARM PLACED IN OPERATION

A new farm of 247 acres in Wood County was in operation for the first year. This substation will answer the problems of the farmer on the heavy lake or Brookston soil of northwest Ohio. Already it has hundreds of plots in projects on drainage, soil structure, additives, rotations and the like. Also it will deal with specialized crops peculiar to this region, such as sugar beets and canning tomatoes. Hundreds of tomato varieties and crosses are grown to find a tomato of quality and high yield coupled with disease resistance.

Poultrymen of the state saw a new phase of the industry added last year, namely, turkey production. This includes disease prevention and control, type of litter, range rearing vs. pole shelter care, and other problems in production of turkeys.

Oak wilt was a new threat to forests and woodlots. Several departments combined under an emergency appropriation to study the disease and its control. State departments, particularly agriculture and natural resources, cooperated. Private industry added finances. Some progress is noted, especially in spread of the disease by insects. Control has thus far included destruction of stumps and parts not used commercially for lumber.

The Horticulture Department introduced the Ruby Apple, the third new superior commercial variety from its 25 years of breeding. Blight in apple and pear trees—feared and uncontrolled for years by commercial growers— is this year seemingly conquered by an antibiotic, streptomycin.

In marketing studies of the year attention was given to type of product preferred by consumers. Consumer preference studies were made in apples and peaches, in retailing meats, in packages for milk. Prepackaging at the farm level was studied with results especially promising with sweet corn.

Hundreds of projects are conducted at the agricultural experiment station. Those enumerated above are only part of the up-to-date, new ideas being explored to keep the research program in tune with today's demands and to foresee tomorrow's questions. Many projects also are in progress at The Ohio State University. Graduate students and staff members conduct research at both institutions.

During the year three members of the staff retired—Dr. J. I. Falconer, Chairman of the Department of Agricultural Economics and Rural Sociology, Lloyd E. Thatcher in Agronomy, and R. C. Thomas in Botany and Plant Pathology. Dr. Mervin G. Smith was appointed Chairman of the Department of Agricultural Economics and Rural Sociology. Dr. M. E. Cravens, Jr. and Dr. J. W. Sharp were added to the marketing staff of this department. Dr. A. F. Schmitthenner joined the staff of the Botany and Plant Pathology Department to work on forage crop diseases.

In Animal Science Dr. Howard S. Teague in swine research joined the staff, while Dr. Richard F. Wilson came to Ohio in both teaching and research in swine production.

The Veterinary Science Department was moved to Wooster from Reynoldsburg, as three new laboratories (costing $150,000) were completed. A fourth unit will be added by appropriation made this year. Dr. D. L. Thomas was added to this department's staff.

Home Economics enlarged its research program and its staff. Dr. Christine H. Hillman and Dr. Jessie Fischer are new members of the department.

The Ohio Agricultural Experiment Station had its greatest year in publications and other means of disseminating research facts. A new field editor, W. W. Konkle, joined the public relations staff. Close correlation of activities between Station and Extension, and likewise with Vocational Agriculture was maintained. A one-package program of agricultural education to embrace all areas is stressed in Ohio administration, and cooperation among these institutions as well as with state and federal agencies is constantly evident.

The last of the nine outlying farms disposed of since 1950 was sold this year. This was the Strongsville farm of 125 acres in Cuyahoga County. Proceeds will be used to acquire a fruit site in Wayne County.

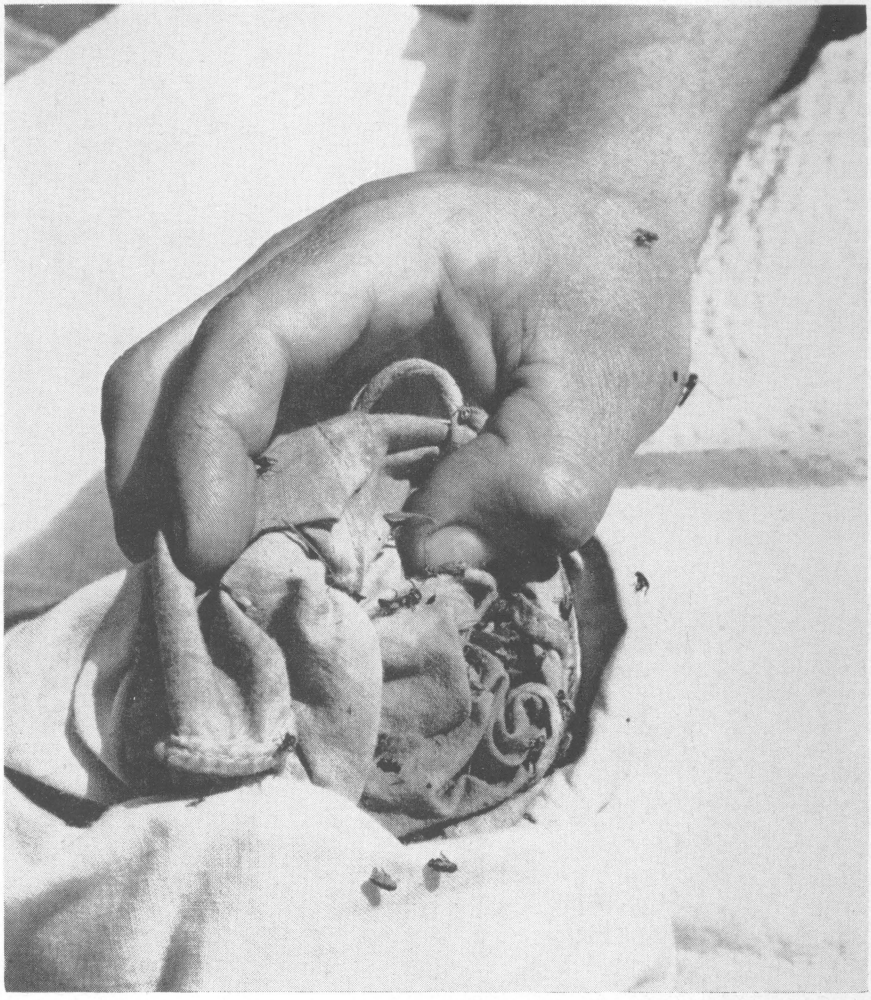
The farm in Sandusky and Erie Counties of William E. Levis, known as the Wahl Farm, was transferred in part during the year as a gift to the Experiment Station. Plans for a new dairy barn there were developed.

The success of the year imposes new responsibilities and insures a continuing research program devoted to Ohio's farmers and their families which will be reflected in the welfare of all citizens, both urban and rural.

Director

RESEARCH AT WORK . . .

Here are a few of the many projects and improvements at the Ohio Agricultural Experiment Station.



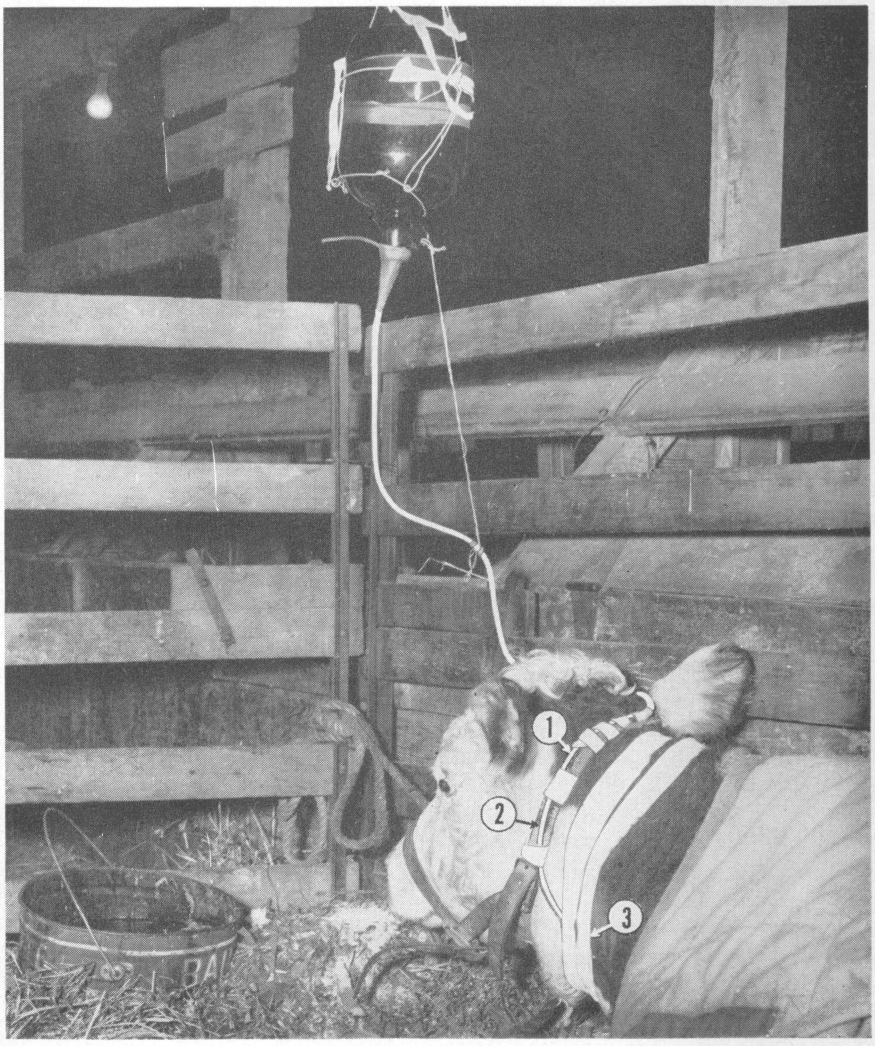
Right: Research in controlling the meadow spittlebug at the Ohio Station has paid off well for farmers. Spraying at the proper time can net the farmer as much as $20 more profit per acre. Here the check on quantities of bugs is being made to make a prediction on whether or not it is necessary to spray the field.

Lower right: Aerial applications of seed, fertilizer and insecticides have come in for a share of the research work. Rates of application and a check on the concentration on the field as well as working out the proper type of installations in the planes were covered in the project.

Lower left: Ensiling of legumes and grass crops offers Ohio farmers a method of utilizing a large amount of feed that might otherwise be wasted, particularly in years of adverse weather conditions. Grass silage is being processed in the photograph shown below.

SHIPPING FEVER TREATMENT STUDIED

Improper handling of cattle during transit often brings out shipping fever. To combat this loss, a project in the Veterinary Science Department has been set up to check new treatments for the disease. The steer shown here is receiving a 5 percent dextrose solution intravenously from the bottle suspended over the animal. The treatment helped get the animal back on a regular feeding schedule.

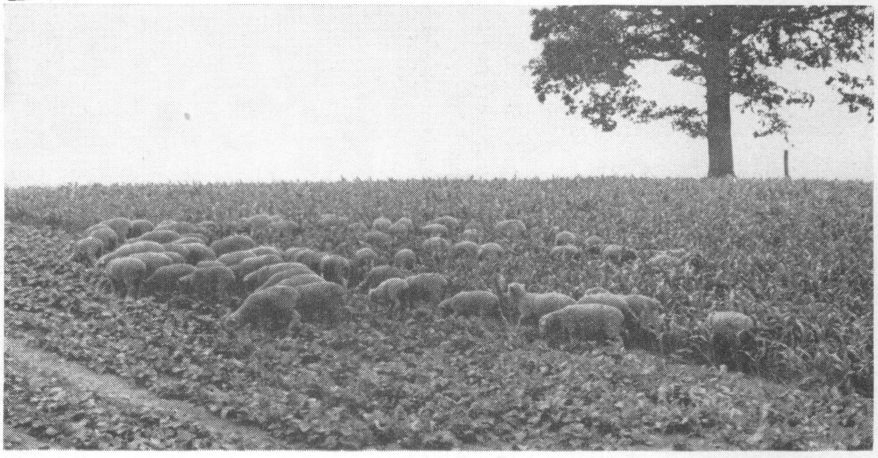


TOMATO BREEDING EXPERIMENTS . . . . .

such as the one shown here cross wild plants with other varieties in an attempt to develop disease resistant stock for Ohio's important vegetable industry.

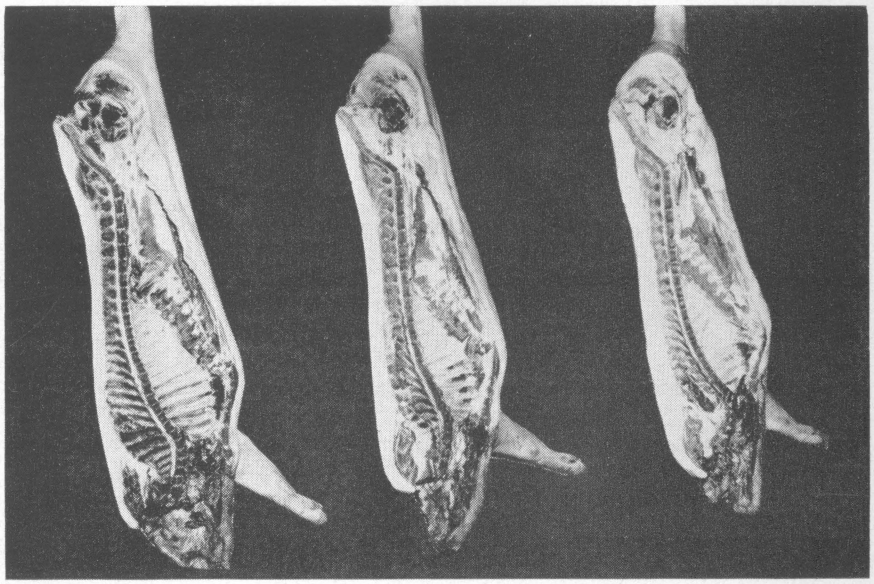
SUMMER FORAGE FOR SHEEP . . . . .

is provided by a mixture of corn drilled about 2 bushels per acre and given about 125 pounds of nitrogen. It provided an excellent summer forage for 136 yearling sheep for 5 weeks on a 2 acre plot.



SUGGEST CHANGES IN HOG GRADING

One of the significant contributions during the past year was a suggested change in the grading methods used by hog buyers. As a result of a survey involving hundreds of hogs, staff economists were able to propose a system of live grading involving the factors of thickness of backfat, body and hind leg length that gave the producers a better price for their hogs and made it more profitable to market a hog desired by the consumer. The carcass on the left is the type demanded by pork consumers because of minimum amount of fat.



FRUIT VARIETIES DEMAND ATTENTION

Small fruit producers are an important part of Ohio's fruit industry and this photograph showing the careful checking of a blueberry yield indicates the interest given fruit production. Horticulturists are constantly checking cultural practices and new varieties to provide the latest information for fruit growers.

SMALL COMBINES . . . .

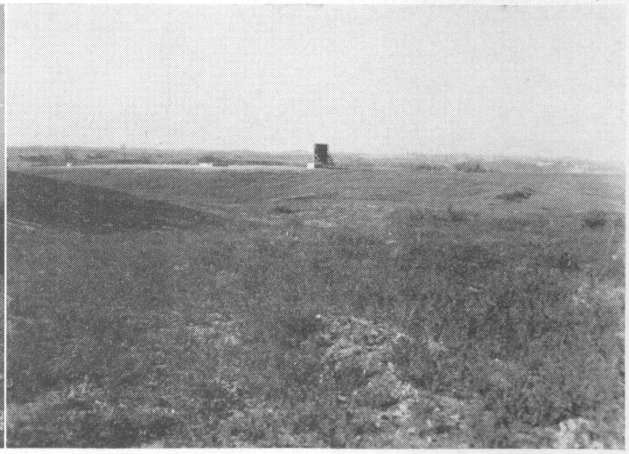
such as this help make accurate checks on the yields of small grain. Information is passed on to Ohio farmers.

Ten Outlying Farms Aid Station's Facilities

This aerial view of the Southeastern Substation at Carpenter shows the layout of the buildings and gives some idea of the type of farming practiced in that area. Nine other farms operated by the Station put into practice operations that are designed to help the farms in the area in which the farmers operate. Beef production, dairying, muck crops or whatever operation is popular in the area dominates the programs in operation on the farms. Staff members working with the farm manager seek the advice of farmers in the area to get tips on what would help most in setting up projects on outlying farms.

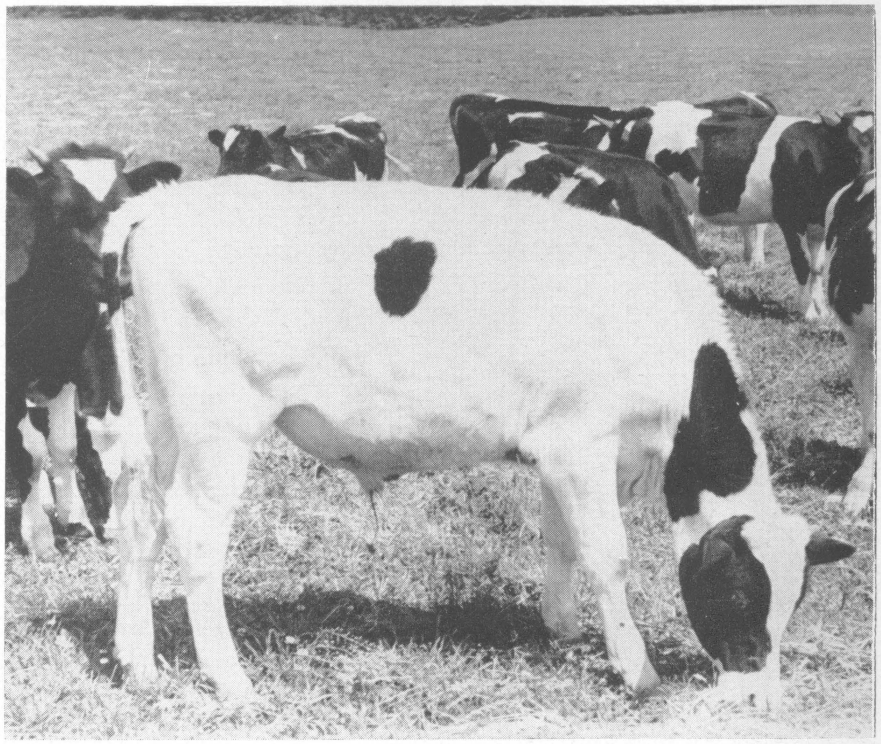
Strip Mine Reclamation Restores Land

Reclaiming land torn up by strip-mining operations has been a major project in the mining areas of Ohio. Through extensive work conducted right on the spoil banks, it has been possible to determine that pasture and trees can be grown on the land. Both foresters and agronomists cooperate in their joint responsibility to establish some form of planting on as much of the strip-mined land as possible.



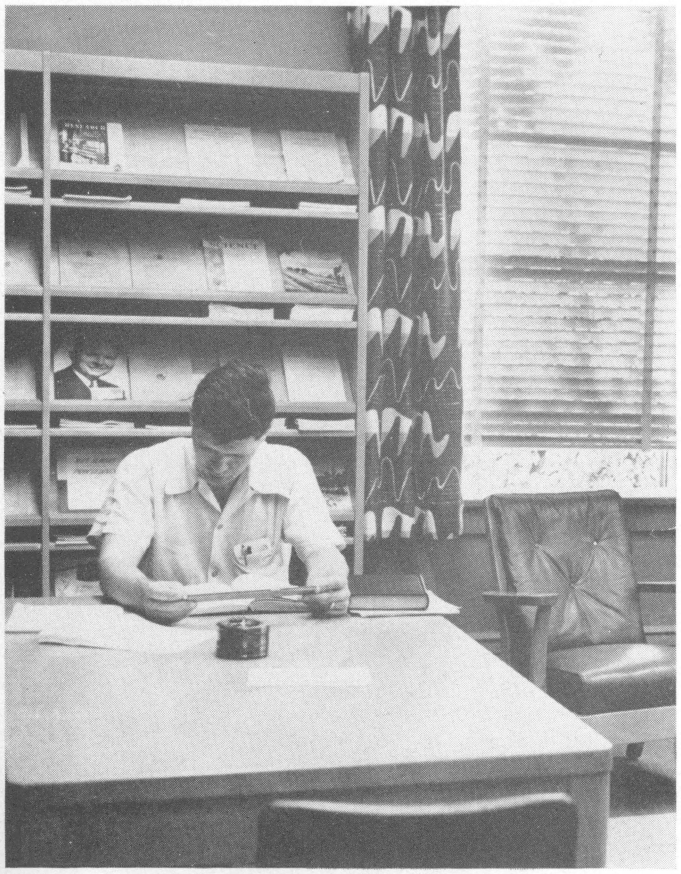
HIGH ROUGHAGE SYSTEM POPULAR

Ohio's high roughage system illustrated by a group of low-cost feeder steers raised by a Wayne County farmer is becoming popular as method of raising low-cost herd replacements. The system involves inoculating the baby calf with some of the cud from an adult animal so that it is able to utilize a hay and grain ration and milk is not fed after the calf is seven weeks old.



NEW LIBRARY READING ROOM

This was one of the improvements at the Station during the past year. A comfortable reading room with the latest scientific journals and other publications of interest to the staff was added to the facilities of the library.

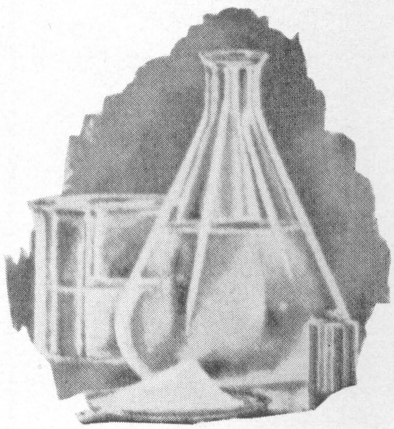


TURKEY STEAKS . . . . .

were introduced to the visitors at Turkey Day last summer. This is another means of making turkey more popular to the consumer. A turkey project has been in operation at the Station for the past two years.

RESEARCH PROJECTS

covering a wide variety of work were carried on at your Experiment Station during the past year.



AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

An analysis of some economic and personal factors of a selected group of young farm families.
Marketing slaughter livestock by carcass weight and grade.
Effect of variation in sanitary inspection, use classification, buying plans, and prices upon the milk supply of Ohio markets.
Distribution of milk in paper containers.
Adjusting Ohio farm lease to meet new developments.
Rural leadership and social action.
Trends in population and social changes in Ohio.
Methods and costs in the retail distribution of meat and meat products.
Marketing livestock through auctions in Ohio.
A farm organization study of the swine enterprise in a commercial hog producing area of Ohio.
A study of costs, consumer acceptance and problems involved in the marketing of washed and unwashed potatoes.
Marketing peaches in northern Ohio.
Economic and social aspects of soil conservation in Ohio.
Elasticity of demand for farm products important to Ohio agriculture.
Prepackaging of farm products at the farm level.
Changes in Ohio farm land values.
Income to Ohio farms by counties.
Desirable adjustments in Ohio's crop and livestock pattern for 1955 and for the years ahead.

AGRICULTURAL ENGINEERING

Tillage practice in relation to soil tilth and crop response.
Interrelationships of crop rotations, organic matter input, soil structural conditions and the internal drainage characteristics of soils.
Development of equipment and evaluation processes for agricultural aircraft.
Harvesting and storing of corn and small grains.
Eradication or control of weeds and other undesired plants.
Conservation and improvement of muck soils.
Utilizing short pieces of lumber for farm buildings.

AGRONOMY

Breeding field corn for Ohio.
Factors affecting growth and mineral absorption by plants.
Factors affecting growth and mineral absorption by plants.
Potash and nitrogen requirements of corn and oats as affected by sweet clover and other crop residues.
Response of winter wheat varieties and strains to climatic and edaphic factors.
Nutrition and physiology of soybeans.
Lime-phosphate studies.
Oat breeding and testing.
Grazing management.
Spring and fall management of ladino clover and birdsfoot trefoil.
Pasture species for beef animals.
Birdsfoot trefoil vs. ladino clover for permanent pasture.
Mulch culture versus plowing for field crops.
Soil structure, formation, importance to crop production, and improvements which may be effected by soil management studies.
Eradication or control of weeds and other undesired plants.
Chemical weed control in sugar beets.
Weed control in turf.
Soil organic matter, maintenance and decomposition in Ohio soils and function in crop growth and productivity.
Production of silages under controlled conditions.
Use of the spectrograph for analysis of soil extracts and plant materials.
Mineral nutrition of corn.
Development of X-ray diffraction techniques for plant materials.
Forage crop ecology and physiology in seeding establishment, crop growth and stand longevity.
Development and evaluation of improved varieties of soybeans for farm and industrial utilization.
Factors affecting the nature and behavior of native and added potassium in soils.
Maintenance of two or more nurseries of vegetatively propagated timothy strains.
Urea foliar spraying of wheat.
Development of improved methods of beeding corn.
Wheat testing and improvement.

Barley breeding and testing.
The Ohio soil survey.
Composition of the parent materials of the glacial soils of Ohio.
Mineral composition of Ohio soil types.
Physical and chemical characteristics of important Ohio soils.
Fry farm crop rotations.
Preliminary and exploratory studies of forage crops.
Sweetclover breeding and strain testing.
Smooth bromegrass culture, breeding, and strain testing.
Culture and rotation experiments with soybeans.
Evaluation of new and standard strains of red clover.
Breeding and evaluation of improved strains of alfalfa.
Role of green manure crops, crop residues and manure on soil productivity when used with varying amounts of nitrogen.
Conservation and improvement of muck soils.
Timothy variety trials.
Soil fertility and fertilizer practices.
Soybean fertility rotation.
Effect of potash rates on meadows.
Soil fertility and fertilizer practices.
Fertilizer rate, grade and placement for corn.
Fertilization of meadow for corn.
Rock phosphate use in Ohio.
Survey of the boron status of Ohio soils.
Manipulation of soils, crops and residues for erosion and water control experiment.
Growth and production of tomatoes in the greenhouse as influenced by various levels of nitrogen.
Cultural practices for sugar beets.
Turf culture and pest control.
Sweet corn project.
Rejuvenation of subsoil.
Seed corn storage studies.
Soil aeration in relation to growth of plants and nutrient uptake by plants.
Daily accumulation of mineral elements in corn plants.
Utilization of synthetic soil conditioners.
Possible uses of cellulose derivatives for the amelioration of poor soil structure.
Potassium nutritional studies.
Legume-reaction experiment.
Corn, wheat and oats in continuous culture.

ANIMAL SCIENCE

Effect of age of castration on calves.
Influence of ladino clover and birdsfoot trefoil pasture on reproductive efficiency in sheep.
Influence of mineral ions of pancreatic digestion.
The effect of adsorbents and minerals on the determination of riboflavin and other B-complex vitamins.
Improvement of the method for determining the crude fiber and nitrogen.
Digestion studies.—Factors affecting the utilization of feeds by ruminants.
Improvement of beef cattle through breeding practices.
Improving protein supplements for fattening steers when poor quality roughage is used.
Use of outbred and inbred lines in hog production.
Materials supplemental to corn, protein, and minerals for pigs and methods of feeding on pasture.
Antibiotics, B_{12} and other B vitamin supplements for pigs.
Improving the feeds and feeding practices related to the raising of baby pigs on synthetic milk.
Types of sheep and systems of breeding for market lamb production.
Returns per acre in steer feeding.
Processing of fresh meat.
Adaptability and place of Columbia sheep in Ohio.
Meadows and pastures for hay and forage on the sheep farm.
Infant mortality among lambs.
Relative value of different grades of yearling steer cattle.
Relative economic value of using beef and native dairy type cows in a commercial herd.
Economic returns from a herd of shorthorn cows bred to a beef type bull.
Possible use of short chain fatty acids and urea in ruminant nutrition.
Effect of quality and type of roughage on feed utilization in sheep.
Value of two different supplements for fattening yearling cattle.
Adaptation, place, and use of Australian-New Zealand strong-wooled merinos in Ohio.
Further studies on factors which influence the utilization of urea by ruminants.
Studies on the possible relationship of vitamin B_{12} and antibiotics in nutrition.
Comparison of purebred and crossbred pigs and of systems of crossbreeding.
Native vs. western ewes for market lamb production.
Returns per acre in steer feeding.
Silage for fattening beef cattle.

BOTANY AND PLANT PATHOLOGY

Control of the mosaic diseases of tomatoes
Cereal disease investigation.
Forage crop disease.
Fungicides and spray adjuvants for fruit disease control.
Comparison of new fungicidal chemotherapeutic and nutritional formulations for the control of vegetable diseases.
Development of new methods for the application of fungicidal formulations to vegetables.
Improvement of vegetable stands by the use of seed treatments.
Development of disease resistant strains of cucumbers.
Stone fruit diseases and their control.
Disease and insect resistance in the tomato.
Biology of the tomato.
Evaluation of the collection of domestic and wild species of tomato.
Diseases of carnations.
Microbiological investigations of silages.
Relation of bacteriophages to bacteria with special reference to plant pathogens.
Study of the oak wilt disease.
Black raspberry cultural practices.

Apple measles disease or internal bark necrosis of apples.
Control of soil-borne disease of glasshouse vegetable crops by nutrient solution culture.
Physiology and genetics of plant pathogenic microorganisms when grown in the presence of various radioisotopes.
Study of the phloem necrosis disease of elm.
Control of sugar beet diseases.

DAIRY SCIENCE

Pasture species for dairy.
Chemical analysis of crops and silage.
Feeding trials with meadow crop silage.
Crops and practices for a dairy enterprise.
Fundamental factors affecting the development of dairy calves.
Nutritive aspects of milk fever.
A study of the cellular antigens in the blood of cattle.
Effectiveness of reciprocal crossing in blending and fixing the desirable dairy characteristics of various families of Holstein-Friesian cattle.
Ground soybeans vs. soybean oilmeal in a simple grain mixture.
Value of oats in the simple grain mixture.
Limited vs. normal grain feeding to Jersey cows under soil conservation farming.
Relationship between the serum protein-bound iodine and their possible application to dairy production.
Application of the high roughage system to raising dairy calves for beef feeders.
Relationship of fat content in the dairy ration to milk and butterfat production.
Use of cattle twins and triplets to study the relative influence of heredity and management on production and type.

ENTOMOLOGY

Biology, ecology and control of forage crop insects.
Evaluating insect resistance in varieties and strains of onion.
Insect phases of the corn research program with special emphasis on the European corn borer.
Control of the oriental fruit moth by parasitization and/or insecticides.
Factors influencing the incidence of apple insects in different orchard areas.
Evaluating insect resistance in varieties and strains of potato.
Insects and allied pests that attack glasshouse vegetable crops.
Biological and chemical control of the Japanese beetle.
Economic aspects affecting honey production and insect pollination of agricultural crops.
Biology and control of insect pests of stone fruits.
Investigations on insects attacking ornamental plants.
Biology and control of vegetable crop insects.
A study of the possible insect vectors of the oak wilt disease organism.
Biology, ecology, and control of insects attacking apples and pears.
Strawberry insects (Improvements in Control).

FORESTRY

Sustained yield management of experimental forests.
Preservative treatment of fence posts.
Reclamation and use of strip-mined land in Ohio.
Multiflora rose as a living fence.
Ecological aspects of the oak wilt disease.
Management of forest and Christmas tree plantations in Ohio.
Use of lime and fertilizer in the sugarbush.
Testing varieties and strains of nut trees.

HOME ECONOMICS

Determination of suitable work surface materials and finishes used in rural homes from the standpoint of maintenance, durability, and cost.
Detergents and their use in automatic washing machines.
Histological changes in frozen roasters during storage at —10°, 0° F., + 10° F.
Protein and amino acid metabolism in young college women.
Effect of 3 levels of fat in isocaloric diets on the retention of calcium of college women.
An analysis of the adolescent period in terms of freedoms and responsibilities within a family unit.
Nutritional status of school children. The school lunch as an influencing factor.
Preservation of poultry by canning: Effect of aging and of calcium chloride additions on the texture of canned poultry.
Automatic clothes drying as compared to outdoor line drying.

HORTICULTURE

Nutrient status of Ohio vineyards and of the effect of various pruning, soil management and fertilization practices on the growth, yield and quality of grapes.
Respiration and associated factors and indices in the determination of the period of marketability of fresh fruits and vegetables.
Mineral nutrition of fruit trees with particular reference to potassium.
Nitrogen nutrition of fruit trees and its relationship to the cations magnesium and potassium.
Response of the peach to different cultural practices.
Responses of the red raspberry to different soil management practices, training systems, and rates of nitrogen fertilization.
Suitability of Ohio grows fruit and vegetable varieties for processing.
Effect of moisture levels on the quality, including color, flavor, texture, carbohydrate and ascorbic acid contents of fresh and processed potatoes, cabbage, tomatoes and strawberries.
Modified atmosphere holding and storage of vegetables.
Continuation of the study of the handling of Rome Beauty apples for storage.
Causes of abscission of flowers and young fruits.
Effect of adding certain vitamins of the B complex singly and in several combinations on mushroom.

Growth promoting chemicals in relation to fruit set and yield of certain horticultural crops.
Multiplication, preservation and determination of potential value of pear varieties for north central states.
Effects of various cultural practices on the growth and flowering of greenhouse roses.
Chemical weed control with vegetable crops.
Chemical weed control with horticultural crops.
Variation in night temperature and potassium level in relation to fruit-set, maturity, and blotchy-ripening with the tomato varieties, globe (Strain A) and master Marglobe in the greenhouse.
Growth and production of tomatoes in the greenhouse.
Development of still and carbonated fruit juice blends and fruit juice concentrates using Ohio fruits.
Effect of insecticides and fungicides on the composition, quality and shelf life of processed vegetables and fruits.
A study of the fermentation of Ohio fruits and the stability of wines.
Vegetable variety testing.
Development and testing of improved varieties of tomatoes.
Fertilizers for early cabbage, tomatoes, cucumbers, and sweet corn in rotation on irrigated sandy loam.
Interrelation of irrigation, rate of fertilizer application, and spacing of hills of the yield of potatoes.
Factors affecting and means of preventing the cracking of tomatoes grown on stakes.
Studies in propagation of ornamental plants.
Hardiness, adaptability and identification of species of some woody ornamental plants.
Cause and prevention of onion blast or tip burn.
Conservation of muck.
Economics of spraying.
Phenological and weather studies in relation to orcharding.
Optimum economic life of commercial orchards.
Chemical sprays as a means of inducing flower and fruit abscission in the apple and peach in order to replace hand thinning or to change the year of bearing.
Use of growth promoting substances (Hormones) in relation to the pre-harvest abscission of fruit.
Orchard culture and spraying at county experiment farms.
Testing varieties and strains of nut trees.
Apple variety trials.
Manufacture and quality analysis of baby foods.
Nitrogen fertilization studies with peach trees.
Nitrogen fertilization with cherry trees.
Evaluation of promising new selections and varieties of stone and small fruits for Ohio.
Soil and cultural treatments for blueberries.
Growth and yield of strawberries.
Breeding greenhouse vegetables.
Causes of tree decline in varieties of European plum.
Effect of growth promoting substances upon the development of framework and growth of young apple trees.
Apple breeding for the purpose of producing late-keeping varieties.
Multiplication, preservation and determination of potential value of pear varieties.
Time of harvesting Beurre Bosc and other pears.
Growth and fruitfulness of certain Ohio apple varieties as affected by Malling and other dwarfing understocks.
Studies of flower bud initiation and flower color of the hydrangeas.
Nutritional and leafdrop studies with azaleas.
Studies of the flower bud initiation in the lily as influenced by storage.
Variety studies with some greenhouse ornamental plants.
Productivity of nursery soils.
Dehydration of lima beans.

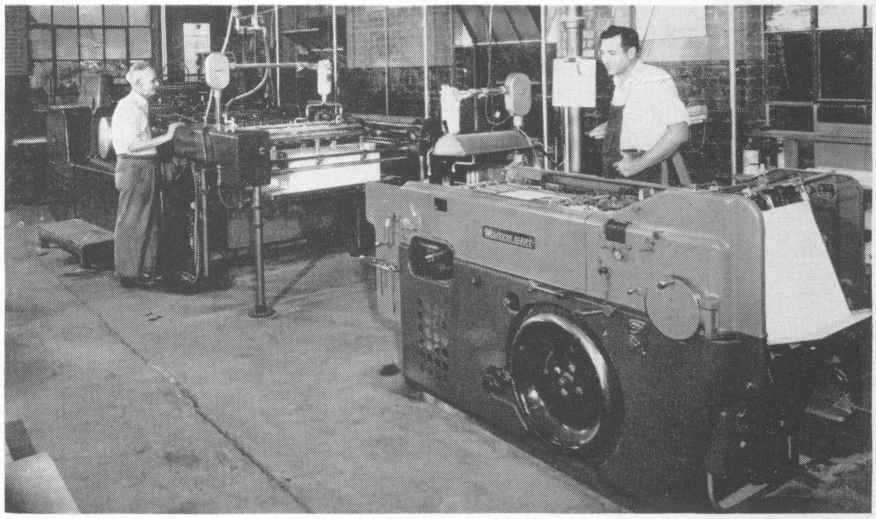
POULTRY SCIENCE

Effect of litter, management and the use of histomonastatic agents upon growth, livability and reproductive ability of turkeys.
Species of coccidia affecting turkeys.
Channels, costs and margins of marketing eggs under different methods in the state of Ohio.
Sources of poultry products distributed by the various types of marketing agencies and used in the large centers in Ohio.
Nutritional physiological and genetic factors influencing the growth and body composition of stunted, normal and rapidly growing chickens.
Nutritional and physiological factors affecting the production, hatchability and quality of eggs.
Methods of minimizing losses in quality of poultry products.
Factors in built-up litter responsible for reduction of mortality in chickens.
Growth, reproduction and mortality of chicks as affected by the litter, drugs and antibiotics.
Comparison of rations for laying flock.
Effect of rearing methods upon nesting habits of pullets.
Economic factors involved in producing poultry on built-up litter.
Fermentation products as a source of growth factors for poultry.
Pastures for chickens.

VETERINARY SCIENCE

Use of Huddleson's mucoid vaccine in cattle.
Application of a method to differentiate between the agglutinin titers of Brucellosis vaccinated and infected cattle, and to determine the limits of its use.
Application of a new composite milk test as a screening method for identifying Brucellosis infection.
Mastitis of cattle. I. Factors responsible for variation in resistance to mastitis.
Antihog cholera serum and rabbit propagated vaccine for immunization of young pigs against hog cholera.
Application of a new composite milk test.
Calfhood Brucellosis vaccination—Duration of resistance.

STATION PUBLICATIONS



Most of the Station publications are produced in the printing department located in Thorne Hall. Here two members of the department operate two high speed automatic presses that will print up to 5,000 sheets per hour. A modern composing room prepares the material for publication.

RESEARCH BULLETINS

706—Plan Dairy Chores.

708—Blast Furnace Slag as a Soil Amendment.

710—Cleaning Eggs for Market.

712—Financing Feeder Livestock.

713—Factors Affecting Farm Income and Crop Production.

714—Use of Frozen Foods in Ohio.

716—Price-Quality Relationship of Frozen and Canned Foods.

717—Laundering Blankets in Automatic Washers.

719—Marketing Apples.

720—Grower Control of Codling Moth.

721—Cost of Collecting Eggs from Farms.

723—Accumulation of Radioisotopes in Corn Leaves.

724—Handling Ground Feed on the Farm.

725—70th Annual Report.

726—Soil Porosity Affects Potatoes.

729—Vitamin B-12 Supplements for Growing and Fattening Pigs.

730—71st Annual Report.

731—Linseed Oil Meal for Milking Cows.

732—Supplements to Poor Quality Hay for Fattening Cattle.

RESEARCH CIRCULARS

9—Wettable Powder vs. Dry-Mix Dithiocarbamates.

13—Relation of Mineral Content of Summer Milk to Pasture Herbage.

18—Silage Densities and Losses in Laboratory Silos.

19—Evaluating Sweet Corn for Processing.

20—Acceptability of High Dry Matter Silage.

Distribution of the thousands of bulletins, circulars and Farm and Home Research takes place in the mailing room adjacent to the press room. In addition, many daily requests for individual publications add many publications that are distributed to interested people who request them.

DEPARTMENTAL SERIES

Botany and Plant Pathology

15—Sprays and Insecticides.

Entomology

22—Fall Applications to Control Meadow Spittlebug.

PUBLIC RELATIONS SERIES

15—Southeast Substation.

16—Research Pays.

17—Station Directory.

BI-MONTHLY

Farm and Home Research. (6 issues)

OHIO AGRICULTURAL EXPERIMENT STATION
STATEMENT OF INCOME AND EXPENDITURES FOR FISCAL YEAR ENDING JUNE 30, 1953

	HATCH	ADAMS	PURNELL	BANKHEAD-JONES SECTION 5	BANKHEAD-JONES SECTION 9	TOTAL ALL OTHER FUNDS
Balance July 1, 1952	$ 0	$ 0	$ 0	$ 0	$ 0	$ 353 686 88
Appropriation and Cash Receipts	15,000 00	15 000 00	60,000 00	118 853 05	154 180 85	1,594 586 76
TOTAL	$15,000 00	$15 000 00	$60,000 00	$118 853 05	$154 180 85	$1 948 273 64
Expenditures						
Personal Services	$13,237 04	$14,118 42	$55,858 22	$110,306 70	$135 505 72	$ 997 344 09
Travel	880 57	12 60	1,822 62	1,388 85	6 583 00	25 449 10
Transportation			1 56	43 71	49 27	7 186 31
Communication			6 91		35 70	9,180 04
Rents and Utilities			2 39			24,765 86
Printing and Binding	206 25		9 37	51 78	322 06	6,883 13
Other Contractural Services			310 27	391 15	2 179 72	27,190 97
Supplies and Materials	101 14	604 98	1 469 49	5,019 08	3 786 10	312,954 35
Equipment	575 00	264 00	519 17	1,371 35	3 805 52	50,582 97
Lands and Structures				280.43	942 41	163,336 06
Total Expenditures	$15 000 00	$15,000 00	$60,000 00	$118 853.05	$153,209 50	$1,624 872 88
Funds lapsed and unavailable for use						4,845 71
Balance June 30, 1953	0	0	0	$ 0	$ 971 35	$ 318 555 05
TOTAL	$15,000 00	$15,000 00	$60,000 00	$118 853 05	$154,180 85	$1,948,273 64

TOURS, FIELD DAYS AND VISITING GROUPS

During the year about 19,000 individuals were recorded as visitors.
The following is a summary of visiting groups:

NO. OF GROUPS	TYPE OF GROUP	ATTENDANCE
11	Garden and Farm Women's Clubs	326
19	Vocational Agriculture Groups	926
3	Veterans Classes	55
14	Grade and High School Students	590
8	College Students	161
8	Out of State Groups	238
21	Miscellaneous Groups	1,229
48	Miscellaneous Meetings	1,190
12	STATION FIELD DAYS	9,405
6	Field Days on Outlying Farms	3,960
18	County Groups	556
	Foreign Visitors	130
	Miscellaneous Visitors	52
122	Total	18,818

RADIO PROGRAMS

The Station broadcasted a total of 264 programs, distributed as follows·

WWST, Wooster (live shows)	52	WLW, Cincinnati	13
WHKC, Columbus	12	WRFD, Worthington	91
WOSU, Columbus	67	WGAR, Cleveland	22
KDKA, Pittsburgh	5	KDKA, Pittsburgh	5
WTRF, Martins Ferry	2		

Every department provided several programs each. A total of 57 staff members participated and covered all phases of research work.

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